

CLAIMS

1 1. (original) A method, comprising:

2 receiving one or more demands for service in a mesh network, which network comprises a
3 plurality of nodes interconnected by a plurality of links; and

4 mapping each of the one or more demands onto a primary path and a restoration path in the
5 network to generate at least one path plan for the one or more demands in the network, wherein the
6 at least one path plan is generated as a function of (a) one or more cost criteria associated with the
7 at least one path plan and (b) a failure-related cross-connection criterion associated with the path
8 plan.

1 2. (original) The invention of claim 1, wherein the at least one path plan is generated

2 by:

3 calculating a first set of one or more path plans that satisfy the one or more cost criteria;

4 calculating a second set of one or more path plans that satisfy the failure-related
5 cross-connection criterion;

6 determining whether the first and second sets have any path plans in common; and

7 if not, then, until the first and second sets have at least one path plan in common, relaxing
8 the one or more cost criteria and recalculating the first set.

1 3. (currently amended) The invention of claim 2, wherein the failure-related
2 cross-connection criterion specifies a maximum number of cross-connections that are changed in
3 any node in the network following a failure in the network, wherein a path plan does not satisfy the
4 failure-related cross-connection criterion if the number of failure-related cross-connections that are
5 changed in any node in the path plan following a failure in the network exceeds the specified
6 maximum number.

1 4. (original) The invention of claim 2, wherein the one or more cost criteria are a
2 function of at least one of sharing degree, administrative weight, link utilization, and available
3 capacity.

1 5. (original) The invention of claim 1, wherein the at least one path plan is generated
2 by:
3 (a) calculating a set of node-disjoint path pairs for the one or more demands based on the
4 failure-related cross-connection criterion, wherein a node-disjoint path pair is calculated for each
5 demand;
6 (b) identifying primary and restoration paths for each node-disjoint path pair in the set
7 to generate a path plan for the one or more demands;
8 (c) determining whether the path plan satisfies the failure-related cross-connection
9 criterion;
10 (d) saving, when the path plan satisfies the failure-related cross-connection criterion, the
11 path plan;
12 (e) repeating steps (a)-(d) to generate two or more path plans that satisfy the
13 failure-related cross-connection criterion; and
14 (f) selecting one of the path plans based on the one or more cost criteria.

1 6. (original) The invention of claim 5, wherein, when the path plan satisfies the
2 failure-related cross-connection criterion, steps (b)-(d) are repeated with a constraint that excludes
3 each and every saved path plan.

1 7. (original) The invention of claim 6, wherein steps (b)-(d) are repeated only until the
2 path plan fails the failure-related cross-connection criterion.

1 8. (original) The invention of claim 5, wherein, when the path plan fails the
2 failure-related cross-connection criterion, steps (a)-(d) are repeated with a constraint that excludes
3 each set of node-disjoint paths.

1 9. (currently amended) The invention of claim 8, wherein, when calculating a set of
2 node-disjoint path pairs for the one or more demands per step (a) fails to find a feasible solution, the
3 failure-related cross-connection criterion is relaxed and steps (a)-(e) are repeated using the relaxed
4 failure-related cross-connection criterion.

1 10. (original) A path manager for a mesh communications network, the manager
2 comprising one or more computing elements, wherein the manager is adapted to:

3 receive one or more demands for service in the mesh network, which network comprises a
4 plurality of nodes interconnected by a plurality of links; and

5 map each of the one or more demands onto a primary path and a restoration path in the
6 network to generate at least one path plan for the one or more demands in the network, wherein the
7 at least one path plan is generated as a function of (a) one or more cost criteria associated with the
8 at least one path plan and (b) a failure-related cross-connection criterion associated with the path
9 plan.

1 11. (original) The invention of claim 10, wherein the at least one path plan is generated
2 by:

3 calculating a first set of one or more path plans that satisfy the one or more cost criteria;
4 calculating a second set of one or more path plans that satisfy the failure-related
5 cross-connection criterion;

6 determining whether the first and second sets have any path plans in common; and
7 if not, then, until the first and second sets have at least one path plan in common, relaxing
8 the one or more cost criteria and recalculating the first set.

1 12. (currently amended) The invention of claim 11, wherein the failure-related
2 cross-connection criterion specifies a maximum number of cross-connections that are changed in
3 any node in the network following a failure in the network, wherein a path plan does not satisfy the
4 failure-related cross-connection criterion if the number of failure-related cross-connections that are
5 changed in any node in the path plan following a failure in the network exceeds the specified
6 maximum number.

1 13. (original) The invention of claim 11, wherein the one or more cost criteria are a
2 function of at least one of sharing degree, administrative weight, link utilization, and available
3 capacity.

1 14. (original) The invention of claim 10, wherein the at least one path plan is generated
2 by:
3 (a) calculating a set of node-disjoint path pairs for the one or more demands based on the
4 failure-related cross-connection criterion, wherein a node-disjoint path pair is calculated for each
5 demand;
6 (b) identifying primary and restoration paths for each node-disjoint path pair in the set
7 to generate a path plan for the one or more demands;
8 (c) determining whether the path plan satisfies the failure-related cross-connection
9 criterion;
10 (d) saving, when the path plan satisfies the failure-related cross-connection criterion, the
11 path plan;
12 (e) repeating steps (a)-(d) to generate two or more path plans that satisfy the
13 failure-related cross-connection criterion; and
14 (f) selecting one of the path plans based on the one or more cost criteria.

1 15. (original) The invention of claim 14, wherein, when the path plan satisfies the
2 failure-related cross-connection criterion, steps (b)-(d) are repeated with a constraint that excludes
3 each and every saved path plan.

1 16. (original) The invention of claim 15, wherein steps (b)-(d) are repeated only until the
2 path plan fails the failure-related cross-connection criterion.

1 17. (original) The invention of claim 14, wherein, when the path plan fails the
2 failure-related cross-connection criterion, steps (a)-(d) are repeated with a constraint that excludes
3 each set of node-disjoint paths.

1 18. (currently amended) The invention of claim 17, wherein, when calculating a set of
2 node-disjoint path pairs for the one or more demands per step (a) fails to find a feasible solution, the
3 failure-related cross-connection criterion is relaxed and steps (a)-(e) are repeated using the relaxed
4 failure-related cross-connection criterion.

1 19. (new) The invention of claim 10, wherein the failure-related cross-connection
2 criterion specifies a maximum number of cross-connections that are changed in any node in the
3 network following a failure in the network, wherein a path plan does not satisfy the failure-related
4 cross-connection criterion if the number of failure-related cross-connections that are changed in any
5 node in the path plan following a failure in the network exceeds the specified maximum number.

1 20. (new) The invention of claim 1, wherein the failure-related cross-connection
2 criterion specifies a maximum number of cross-connections that are changed in any node in the
3 network following a failure in the network, wherein a path plan does not satisfy the failure-related
4 cross-connection criterion if the number of failure-related cross-connections that are changed in any
5 node in the path plan following a failure in the network exceeds the specified maximum number.